

The Problem of Soviet Capabilities in Geodesy  
and Cartography

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The CIA is sponsoring a project under the direction of the Geographic Division undertaken by the [REDACTED] for purposes of (1) making a comprehensive study of the Soviet geodetic and cartographic establishment; and (2) preparing intelligence reports and estimates of Soviet capabilities in foreign and domestic mapping.

The Soviet Union possesses a geodetic and cartographic establishment believed to be second to none in the world. It has made important advances in scientific research and has been responsible for transforming the vast areas of the Soviet Union from one of the poorest to one of the better mapped countries of the world within the short span of 33 years. Very little is known, however, of the structure and organization of its research and mapping agencies.

The project is designed to study and analyze the highly complex Soviet mapping organization and to determine the status of its activity. The project will, within the limits of available information, determine the potential of the Soviet organization for meeting the increasingly exacting requirements in geodesy and cartography for possible future military operations. The study will include a comparison of the status of development of Soviet and U. S. geodesy and cartography. The project, as outlined in detail in Appendix A, will attempt to provide the basis for detailed intelligence reports and estimates, of current as well as future Soviet capabilities.

Since geodesy and cartography are included in the broad field of geophysics and geography in the Soviet scientific organization, it is planned that results from the research effort will also include significant information on developments, trends, and new theories and techniques in the fields outlined in Appendix B. This additional information will be noted for the attention of the Office of Scientific Intelligence, CIA, and will be made available to the Committee on Geophysics and Geography, RDB, and other appropriate offices of the IAC agencies.

The results of the project will be varied. The most significant product will be fully coordinated intelligence reports and estimates. Special intelligence items concerning developments, trends, theories, and techniques on topics outlined in Appendix B will be prepared and distributed. Data cards and map overlays presenting pertinent geodetic, cartographic, and geographic information also will be made available.

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APPENDIX A

"SOVIET CAPABILITIES IN FOREIGN AND DOMESTIC MAPPING --  
TO INCLUDE GEODESY, AERIAL PHOTOGRAPHY,  
AND PHOTOGRAMMETRY."

1. Organization of Russian science in the above and related, closely allied, and contributory fields
  - a. Major research institutes; production establishments, and associated organizations -- to include list, history, and status of work and publications
  - b. Key personnel and evaluation of capabilities
  - c. Educational programs, quality and extent of training of personnel, and size of staff
  - d. Availability of Russian material and publication
  - e. Russian cognizance of U.S. methods, procedures, and equipment
2. Technical developments in each of related fields
  - a. Control
    - (1) Evaluation of Russian triangulation methods (5 classes)
      - (a) Sampling of computational and adjustment procedures along transcontinental arc, in at least four approximately equal spaced loops
      - (b) Comparison between U.S. and U.S.S.R. procedures and results of accuracies, speed, and instrumentation
      - (c) Correlation of Russian "classes" with international "orders" of accuracy
      - (d) Extent and location of triangulation of all classes
      - (e) Estimates of future developments, both short- and long-term
    - (2) Evaluation of Russian leveling methods (9 classes)
      - (a) Sampling of computational and adjustment procedure in at least four equally spaced level-net loops
      - (b) Comparison between U.S. and U.S.S.R. procedures and results of accuracies, speed, and instrumentation

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- (c) Correlation of Russian "classes" with international "orders" of accuracy
  - (d) Extent and location of leveling of all classes
  - (e) Estimates of future developments, both short- and long-term
- (3) Russian triaxial ellipsoid and its possible effect upon any or all U.S. mapping procedures
  - (4) Russian methods of effecting inter-continental ties of geodetic control, both east and west; with estimates of future short- and long-term developments
  - (5) Russian claims and procedures involving use of gravity and astronomical data to determine geodetic positions; relative accuracy of Russian methods and possible value of this study to facilitate the U.S. mapping program
  - (6) Feasibility of tying in independent Russian triangulation systems to the main Russian geodetic network
  - (7) Russian astronomical methods in application to geodetic problems
  - (8) Russian studies in terrestrial magnetism that affect cartography
- b. Russian electronic control and mapping methods; comparison with the status of U.S. and British developments
- (1) Shoran
  - (2) Loran
  - (3) Radar
  - (4) Decca
  - (5) Others
- c. Aerial photography for mapping and charting
- (1) Extent and use of coverage
  - (2) Equipment; types and performance, comparison with U.S.

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d. Photogrammetry

- (1) Equipment; types and comparison with U.S., Swiss, German, and British
- (2) Methods; comparison with generally accepted procedures in U. S.
- (3) Product; extent of work and relative accuracy of results

3. Analysis of Russian Cartography

- a. Russian cartographic establishments and practices
  - b. Projections and grids, including the Russian grid referencing system for intercontinental use
  - c. Evaluation of Russian maps and charts
  - d. Russian map coverage
4. Russian methods of computing and projecting for the rapid determination of bearing and range involving long distances from spotting point to objective
5. Incidental geographic and cartographic intelligence obtained in the course of securing other data required in this proposal

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APPENDIX B

As a collateral, but subordinate objective there shall be collected and reported the significant sources and information on developments, trends, new theories and techniques in all fields of science in the Union of Soviet Socialist Republics, which may be located in the course of the project, but with special reference to the following fields:

1. Meteorology — weather forecasting, both short- and long-range dynamic meteorology; meteorological instruments; stratosphere; ozonosphere; ionosphere; attempts at weather control; solar radiation; meteorological optics; meteorological acoustics; micrometeorology.
2. Climatology — use of punched cards in making climatic analyses; microclimatology; uses of climatological studies in agriculture and in industry.
3. Hydrology — floods; flood forecasting; flood control; irrigation projects; power developments; improvement of navigation; forecasting of stream flow; forecasting the dates of freezing of rivers in the spring and of opening in the fall; ground water.
4. Oceanography — oceanic surveys; currents; tides and circulation; ice; salinity; temperature; gravity measurements; sea bottom; ocean margins; chemical and physical characteristics of sea water.
5. Soil Mechanics — infiltration; percolation; soil temperature; soil erosion; characteristics of permafrost; mechanics; soil characteristics.
6. Seismology — earthquakes; seismometers and seismographs; microseisms; forecasting of earthquakes; earthquake-resistant construction (buildings); causes; stresses and strains, waves.
7. Terrestrial Magnetism and Electricity — Magnetic surveys; diurnal and seasonal variations in magnetism and electricity; instruments used in measuring and recording the earth's magnetism and electricity; aurora; magnetic storms.

On the basis of the results thus achieved by the project, OSI may be interested at some future time in developing with this Laboratory a special project or an elaboration of the present one to explore problems of paramount interest to OSI. In this sense, the presently proposed project can serve as an exploratory and a pilot project for OSI, in addition to meeting the immediate needs of the Geographic Division. During the project, close liaison between the Geographic Division and OSI will be maintained.